served in all of the cases. The enthalpy change of the process initiated by the temperature change showed marked decomposition. Change in the enthalpy was observed in osteoarthritic cartilage: -1427 J/g (SD: 139). All samples showed a clear denaturation peak on the calorimetric curve, average: 48°C (SD: 3,26).
Conclusions: This study clarifies the previously reported thermoanalytical results, by providing similar sample environment. The use of thermal analysis could be a simple and effective method for controlling the relationship between biomarkers and disease progression. All samples showed a clear denaturation peak on the calorimetric curve, therefore a volume of the curve was easily calculated giving the enthalpy change of the sample. Characterization of the altered metabolism in cartilage that promotes disease progression should lead to future fundamental treatment options that can prevent structural damage.

Meniscus, Muscle, Tendon & Ligament Biology

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FACTORS ASSOCIATED WITH REPEAT MENISCUS SURGERY IN PATIENTS UNDERGOING SUTURE MENISCUS REPAIR

W.G. Rodkey[1], K.K. Briggs[1], J.R. Steadman[2]
[1]*Steadman Hawkins Research Foundation, Vail, CO;*
[2]*Steadman Hawkins Clinic, Vail, CO*

Purpose: Meniscus repairs have become more common in order to preserve meniscus function and protect the chondral surfaces of the knee. Numerous studies report a high incidence of meniscus repair failures. Our purpose was to determine what factors lead to repeat surgery following suture meniscus repair.
Methods: A single surgeon performed 283 meniscus inside-out suture repairs (age range, 18 to 71 years), including 177 males and 106 females. Ninety-three patients had concurrent ACL reconstruction; 44 additional patients had 2-stage ACL reconstruction. One hundred eighty-one medial and 102 lateral menisci were repaired. Eighty percent (80%) of medial meniscus repairs were in the posterior third, 11% in the middle third, 1% in the anterior third, and 8% extended to all areas of the meniscus. Forty-nine percent (49%) of lateral meniscus repairs were in the posterior third, 26% in the middle third, 22% in the anterior third, and 3% extended to all areas.
Results: Thirty-seven (37) patients (13%) required repeat surgery on their repaired menisci. Eighteen percent (18%) of medial and 10% of lateral repairs required repeat surgery. There were no differences based on age, gender or lesion location. Average time to repeat meniscus surgery was 2.5 years (range, 75 days to 13 years). Thirty-eight percent (38%) of repeat surgeries were within one year, 32% were between one and two years, 16% were between 3 and 5 years, and 14% were greater than 5 years after the initial meniscus repair. Medial repairs required repeat surgery significantly earlier (1.8 years) than lateral repairs (4.5 yrs) (p=0.01). Staged ACL reconstructions had fewer second meniscus surgeries (2%) compared to concurrent ACL reconstructions (16%) (p=0.03). Patients with concurrent ACL reconstructions were 7.6 times more likely to undergo repeat meniscus surgery compared to staged reconstructions [CI: 1.3 to 44.9].
Conclusions: Medial (versus lateral) meniscus suture repairs and repairs with concurrent ACL reconstructions (not staged) were factors that resulted in earlier and higher rates of repeat meniscus surgery. This finding supports performing meniscus repair and ACL reconstruction as separate operations. There were no differences based on age, gender or lesion location.

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STUDY OF CRUCIATE LIGAMENTS IN OSTEOARTHRITIC KNEES AND THEIR ASSOCIATION WITH CLINICAL AND FUNCTIONAL STATUS OF THE KNEE JOINT

A. Goel, A. Aggarwal, B.D. Radotra, S.S. Gill, E. Wardak, V. Goni
Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

Purpose: The use of posterior cruciate ligament (PCL) retaining or sacrificing implants in Total Knee Arthroplasty remains controversial. Although various authors have demonstrated that degenerative changes do occur in cruciate ligaments in osteoarthritic (OA) knees, not much literature is available stating whether clinical symptoms in OA knee are predictive of the degenerative changes in cruciate ligaments. We studied the microscopic degenerative changes in cruciate ligaments in osteoarthritic knees and its correlation with the macroscopic appearance of anterior cruciate ligaments (ACL), clinically apparent deformities of the arthritic knee and its functional status.
Methods: Study was conducted in 30 osteoarthritic knees undergoing Total Knee Arthroplasty (mean age 61.4 years). These cases were assessed preoperatively using the Knee Society Scoring. Macroscopic appearance of ACL and PCL was classified as normal, abnormal (thinned or sclerotic), or ruptured. Furthur, these ligaments were studied for microscopic degenerative changes which were classified into normal, slight, mild, moderate, and severe (stage 0 to 4) depending on the number of microscopic fields involved. The changes in cruciate ligaments were then compared with the knee score, function score, and deformities (like fixed flexion deformity, varus, antero-posterior and medio-lateral instability) for statistical significance.
Results: Knee Score and Knee Function score ranged from 0 to 43 and 5 to 55 respectively with means of 24 and 30.4 respectively. The gross appearance of ACL was normal in 8 (26.67%), abnormal in 14(46.6%) and ruptured in 8. In all cases PCL appeared to be normal. On microscopy, 4 (13.34%) ACL specimens had no changes while 3 (10%) had slight, 4 (13.34%) mild, 10 (33.3%) moderate and 9 (30%) severe changes. Amongst PCL 4 (13.3%) were normal, 3 (10%) had slight, 12 (40%) mild, 7 (23.3%) moderate and 4 (13.3%) severe degenerative changes. The predominant changes were presence of zones of loose fibrous connective tissue (Image 1), cystic, mucinous (Image 2) and myxoid degeneration. Other changes seen were chondroid metaplasia, neovacularisation, hyalinization, hypercellularity and calcifications. Of these, loose fibrous tissue was the most common degenerative change seen. Knee score had a statistically significant association with the microscopic degenerative changes in both anterior and posterior cruciate ligaments (p value <0.05). The histological changes in cruciate ligaments also correlated with the presence of antero-posterior instability (p value <0.05), but there was no significant correlation with degree of flexion deformity, varus, medio-lateral instability or function score.

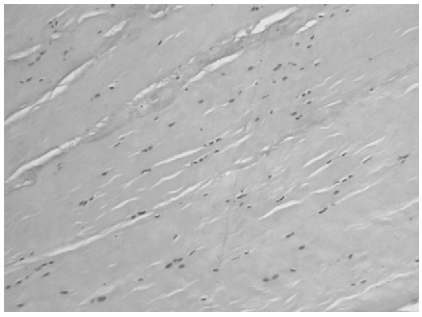

Image 1

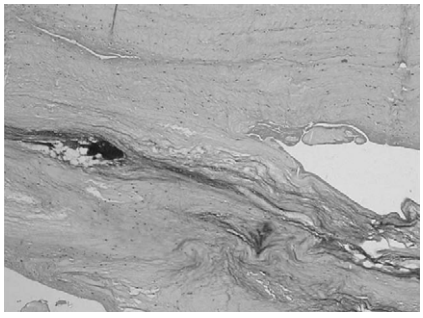

Image 2

Conclusions: We found the knee score to be reliably predictive of the degenerative changes in both anterior and posterior cruciate ligaments while the function scores were not. This could possibly be because knee score is more objective and consists of deformities as assessed by clinician while function score is subjective in nature. Thus, although posterior cruciate ligament may appear normal on macroscopic examination in majority of cases it showes some degree of histological degenerative changes. Patients with poor function scores and antero-posterior instability have more severely degenerated PCL and are perhaps candidates for PCL substituting TKA implants.

Pain: Clinical

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THE NERVE OF OSTEOARTHRITIS PAIN!

J. Hochman[1], M. French[2], H. Gillian[1]
[1]University of Toronto, Women's College Hospital, Toronto, ON, Canada; [2]Women's College Hospital, Toronto, ON, Canada

Purpose: Osteoarthritis (OA) ranks among the top ten causes of disability world-wide. Pain is the most common, disabling symptom. Historically, pain in OA has been attributed to local tissue injury and referred to as "nociceptive pain". However, recent studies suggest that people with OA can experience pain due to both nociceptive and neuropathic pain (NP) mechanisms. NP arises from a lesion or dysfunction in nerve pathways that transmit pain sensations and is characterized by a unique symptom profile. The purpose of this study was to determine the frequency of neuropathic pain-type symptoms reported by adults with chronic, symptomatic, knee OA using data from focus groups on the OA pain experience.
Methods: Adults with chronic, symptomatic knee OA were recruited from an existing population-based OA cohort to participate in focus groups (FGs) on the OA pain experience. Participants were asked open-ended and focused questions to obtain detailed descriptions of their knee pain. The discussions were audio taped and transcribed verbatim. At the end of FGs, a questionnaire was self-administered to obtain information on sociodemographic characteristics, and duration and severity of their index joint OA [using Western Ontario and McMaster Universities Arthritis index (WOMAC) total and pain subscores]. FG transcripts were manually reviewed by one reviewer for unprompted mention of any symptoms shown to be associated with NP as follows: burning, prickling, itching, electric shock-like pain, heat, cold, pins and needles, numbness, tingling, and sensitivity to heat, cold, touch or pressure. Statistics: Descriptive statistics were performed using questionnaire and FG data, to assess characteristics of all participants and participants grouped according to whether or not they reported NP symptoms. Frequencies and percents were calculated for each reported NP symptom.
Results: Out of 31 Toronto participants with knee OA, approximately half (48%) reported having at least 1 NP symptom including burning, heat, sensitivity to light touch, pins & needles, numbness, and tingling. Five (16%) participants reported having $\geq$2 NP symptoms. In FGs on the OA pain experience, a number of NP symptoms were reported by people with chronic, symptomatic, knee OA including: burning, heat, sensitivity to light touch, pins & needles, numbness, and tingling. Those with NP symptom(s) were younger in age and had higher WOMAC total and pain subscale scores when compared to those without NP symptom(s). The mean duration of OA differed between the two groups; however, over 20% of data was missing from this category.
Conclusions: From Toronto focus group data, a significant proportion of adults with chronic knee OA pain report having at least one symptom that is typically associated with NP. These selected patients might benefit from further evaluation for NP. As effective NP medications exist, the identification of NP in patients with OA could lead to improved quality of life and reduced disability among people with OA, and thus reduced economic burden to society.

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PHYSICAL ACTIVITIES AND PAIN AFTER TOTAL JOINT REPLACEMENT

I.M. Weller, M.R. Kunz, S. Munce, D. Kennedy, J. Gollish, H.J. Kreder
Sunnybrook Health Sciences Centre, Toronto, ON, Canada

Purpose: To examine the relation between physical activities and pain in total hip (THR) and knee (TKR) replacement patients. To conduct a survey of Canadian orthopaedic surgeons' exercise recommendations after THR and TKR.
Methods: Patients who had a primary THR or TKR five to seven years previously because of osteoarthritis were administered the well-validated Minnesota Leisure-Time Physical Activity Questionnaire, which assesses the frequency, intensity and duration of physical activities. Patients reported on current physical activities and sports and recalled activity two years after their surgery. A survey was mailed to 466 Ontario, Canada, orthopaedic surgeons to determine the types of physical activities recommended to patients following THR or TKR.
Results: Seventy-one male THR patients (mean age $\pm$ SD; 61 $\pm$ 8) and 97 female THR patients (61 $\pm$ 7) were interviewed. Ninety-eight percent of THR respondents reported bending and lifting activities. Half the respondents reported conditioning and non-weight bearing activities. Few respondents reported high impact activities. Sixty male TKR patients (mean age $\pm$ SD; 67 $\pm$ 8 yr) and 108 female TKR patients (67 $\pm$ 7 yr) were interviewed. Ninety-four percent of TKR respondents reported bending or lifting activities and 44% reported conditioning and non-weight bearing activities. For both THR and TKR patients, more men than women reported sports; whereas more women reported housework. Pain was most frequently reported during bending and lifting activities for both THR and TKR patients. Most patients who reported pain, reduced their activity. Results of the surgeon survey showed that surgeons were in agreement with respect to activities such as jogging, hockey, and racquetball (not recommended) and swimming (recommended); however no agreement was seen for activities such as tennis, ice skating, downhill skiing or volleyball. Some patients participated and experienced pain in non-recommended activities. Some activities allowed by surgeons, such as stair climbing, caused pain. Eighteen percent of THR patients reported hip pain during activity at two years post-surgery. This increased significantly to 40% at five to seven years post-surgery. Twenty-nine percent of TKR patients reported knee pain at two years post surgery. This increased slightly to 32% at five to seven years post-surgery.